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Indian Standard

FREIGHT CONTAINERS — REPAIR BEFORE REFURBISHING — GUIDELINES

ICS 55.180.10

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BUREAU OF INDIAN STANDARDS
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NEW DELHI 110002

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Price Group 3

Freight Containers and Pallets Sectional Committee, TED 12

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Freight Containers and Pallets Sectional Committee had been approved by the Transport Engineering Division Council.

The purpose of repair before refurbishment is to bring a container as nearly as possible to new container condition and for complying with safety factors applicable to safe use of a container.

Statuary requirements, if any shall be adhered to.

Indian Standard

FREIGHT CONTAINERS — REPAIR BEFORE REFURBISHING — GUIDELINES

1 SCOPE

This standard provides guidance for the repair of containers prior to refurbishing. Preventive maintenance of containers is outside the scope of this standard.

2 REFERENCES

The following standards contain provisions which through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

IS No.	*Title*
817 (Part 1) : 1992	Training of welders — Code of practice: Manual metal arc welding (*second revision*)
(Part 2) : 1996	Oxyfuel welding (*second revision*)
6569 : 2004	Freight containers — Vocabulary (*third revision*)

3 TERMINOLOGY

For the purpose of this standards definitions given in IS 6569 shall apply.

4 GENERAL REPAIR PROCEDURES

4.1 Repaired containers should meet all applicable requirements of relevant Indian Standards, the international convention for safe containers (CSC) and the customs conventions on containers for the international transport of goods under cover of TIR (Transport International des Routier) carnets.

4.2 After repair, the repaired area should be of equal or higher strength than the original materials and parts used should be of the same or higher strength and thickness than those used in the original manufacture.

4.3 Upon completion of repairs, the repaired area must be prepared for refurbishing. All weld slake, spatter, rust, burned and loose paint, grease and grit must be removed to allow proper adhesion of the coating material.

4.4 All welding should be done by trained welders as per IS 817 (Part 1) and IS 817 (Part 2). Welding rods, steel sheets, etc, used should be equal to those used in the manufacture of original equipment. ISI Handbook of manual metal-arc welding for welders may be referred for guidance. All welding should be:

a) Watertight and free of porosity;
b) Smooth in appearance (no roughness and free of weld spatter, etc);
c) Free of craters;
d) Dimensionally accurate (including warpage); and
e) Free of undercuts.

4.5 Fasteners used for repair should conform to the requirements of the relevant Indian Standards.

Dissimilar metals should be avoided in attachments to minimize electrolysis.

5 REPAIRS TO PARTS AND COMPONENTS

5.1 Corner Fittings

Corner fittings (corner castings) shall not be repaired. These should be replaced with new ones. All welds to corner fittings shall be made with low hydrogen welding rods. To ensure proper engagement of handling devices, it is important that the distance between aperture centres be maintained within the tolerances specified in relevant Indian Standards. Care should be taken to assure that the casting height measured between the top and bottom corner fittings is within specified dimensional tolerances and that the casting is properly positioned horizontally.

5.2 Corner Posts

Damages in corner posts should be repaired in the following way.

5.2.1 *Straightening*

As far as possible straighten the corner post by using either hydraulic or mechanical means without heating. If a dent is too severe to be straightened without heating, heat may be applied only in the damaged area but must not be heated beyond 650°C (dull cherry red colour).

5.2.2 *Inserting*

Damage that cannot be repaired by straightening may be repaired by replacing the damaged area with an insert.

However, the following limitations apply to inserts in the front and rear corner posts:

a) Inserts should be fitted flush with the original material and butt welded.

b) A maximum of two inserts are allowed in a corner post.

c) An insert should not extend through more than half of the external cross-section profile of the post, but should extend through at least 75 mm of the cross-sectional profile of the post. Sections through the complete cross-sectional profile of the post are not acceptable.

d) There is no maximum length limitations for inserts. Full height corner post inserts are acceptable.

e) When a corner post contains two inserts, no part of either insert may occupy any part of the same horizontal plane.

f) Horizontal insert welds of rectangular inserts or extremity welds of diamond or oval shaped inserts shall be a maximum of 150 mm apart.

g) An insert that would terminate within 150 mm of the existing insert should be extended to the existing insert to form a common weld. The common weld should extend horizontally through the profile of the post. When diamond or oval shape inserts are involved, they should, therefore, be cut to provide a horizontal edge that will butt against and be welded to the adjacent insert.

h) Insert shall not terminate vertically on a formal edge.

j) Minimum length of insert shall be 150 mm.

k) If an insert ends within 300 mm of a corner fitting, it should be extended to the fitting.

m) Inserts may be rectangular, oval or diamond in shape.

5.2.3 *Replacement*

When damage to a post cannot be repaired by straightening or inserting, the post should be replaced with a new one made out of same type of material and same profile.

5.3 J-Bars

5.3.1 *Straightening*

Wherever possible, straighten any bend in J-bar without heating. In case straightening cannot be done without heating, apply heat only to the damaged portion up to 650°C (dull cherry red colour). The corner post insert limitations do not apply to J-bars.The only limitation for J-bar inserts are:

a) Inserts shall be fitted flush with the original material and butt welded.

b) Minimum length of inserts is 75 mm.

5.4 Rails

5.4.1 *Top Rails*

5.4.1.1 *Straightening*

Any dents or distortions in the rails or header should be straightened without heating. If heating becomes necessary to assist straightening, apply heat only to the damaged portion up to 650°C (Dull cherry red colour).

5.4.1.2 *Inserting*

Damage that cannot be repaired by straightening should be repaired by replacing the damaged portion with an insert keeping the following limitations in view:

a) Insert may be of any profile that does not extend through the entire cross-sectional profile of the rail.

b) Inserts shall be fitted flush with the original material.

c) Minimum length of an insert should be 150 mm.

d) If an insert would end within 150 mm of another vertical weld in the rail, that should be extended to that weld.

e) If an insert in a top side rail would end within 300 mm of a corner fitting that should be extended to the fitting.

f) If an insert in a header would end within 150 mm of a corner fitting, that should be extended to the fitting.

5.4.1.3 *Sectioning*

Damage that cannot be repaired by straightening or inserting should be repaired by replacing the damaged section of rail, that is, the entire cross-sectional profile of the rail must be replaced keeping in mind the following limitations:

a) Replacement material shall be of the same profile, thickness and strength as the original. Sections shall be butt welded to the original rail.

b) Sections shall be of at least 150 mm in length.

c) If a section would end within 150 mm of another vertical weld in the rail that should be extended to that weld.

d) If a section in a side top rail would end within 300 mm of a corner fitting that should be extended to that fitting. If a section in a header would end within 150 mm of a corner fitting that should be extended to that fitting.

NOTE — If the top rail cannot be repaired by straightening, inserting or sectioning, it shall be replaced with a new one of the same size and specifications.

5.4.2 *Rain Gutter*

5.4.2.1 *Straightening*

Distortions to the rain gutter should be repaired mechanically without applying heat to the component. If the weld connecting the rain gutter to the corner fitting is broken, it should be rewelded.

5.4.2.2 *Removal*

If the rain gutter cannot be brought to its original profile by straightening it should be removed by cutting with hack-saw. No gas cutting should be used as that would distort the header, making it thereby rather impossible to close the door air and light tight.

5.4.3 *Bottom Rails*

Bottom rails should be repaired by straightening, inserting, sectioning or replacement in the same way as top rails, but extra care should be taken to see that container's dimensions are not disturbed. Hence, before starting repairs of the bottom rail by any of the aforesaid process, proper folding and gripping are provided to keep the original sizes of the container within specified limits.

5.5 Side and Front Panels

5.5.1 *Straightening*

Straightening repairs should brought the panel to its original profile. If the damage has stretched the panel to such an extent that the original profile cannot be restored, repair by straightening should not be attempted. Dents and compression lines are to be straightened without heating. To repair splits, cuts, tears or pin-holes when the original profile can be restored, straighten the damaged area, weld the edges of the cut material, clean. mark and prime the repaired area.

5.5.2 *Patching or Inserting*

If the damage cannot be repaired by straightening, an overlapping exterior patch or a butt welded insert may be installed. However, if such patching is going to cover the major portion of a panel, then it would be better to replace the whole panel.

5.5.3 *Replacing Panel Assembly*

While attempting to replace complete side or front panel assembly, it is important to note that specified dimensions and tolerances can be affected. Hence, when performing this repair dimensions and tolerances should be checked before, during and after the repair operations.

5.6 Roof

5.6.1 *Roof Bows*

5.6.1.1 *Straightening*

Depressed roof bows may be straightened by using a 'T' beam and jack.

5.6.1.2 *Replacement*

If the roof bow cannot be straightened, it shall be replaced.

Sections or inserts are not permitted in roof bows. The replacement roof bows should be attached to the roof panel in the same manner as the original roof bows.

5.6.2 *Roof Panel (Flat or Corrugated)*

5.6.2.1 *Straightening and welding*

To repair spits, cuts, tears or pin holes when the original profile can be restored, straighten the damaged area and weld. After welding welded portion shall be ground smooth.

5.6.2.2 Damage that cannot be repaired by straightening should be repaired by installing an overlapping exterior patch. If such patching is going to cover major portion of a panel, it would be better to replace the whole panel.

5.6.2.3 If roof panel assembly covering the complete roof of a container is damaged at many places and patching is not economical, the entire roof assembly should be replaced. While attempting to replace the entire roof, care should be taken that specified dimensions and tolerances are maintained.

5.7 Understructure (or Under Frame)

The container understructure components may have been protected with one of several and different coatings. After repairing these components, the repaired area should be coated with the same type of material that was originally applied.

5.7.1 *Cross-Member (Including Outriggers)*

5.7.1.1 *Straightening*

Cross-members should be straightened by hydraulic or mechanical means without the use of hammering.

5.7.1.2 *Inserting*

When damage to a cross-member cannot be repaired by straightening it may be repaired by installing an insert keeping in view the following limitations:

a) Inserts shall be flush with the cross-member;

b) The top flange of the cross-member securing it to the floor and a minimum of 13 mm of the vertical web shall be left intact. Sections through the complete profile of the cross-member are not permitted except for hot rolled profiles such as I-beams, when a section through the complete profile is acceptable;

c) If an insert would end within 150 mm of another vertical weld in the cross-member, the insert shall be extended to the existing weld;

d) If an insert would end within 150 mm of a bottom side rail to cross-member attachment weld, the insert shall be extended to that weld; and

e) If damage to the cross-member extends along its entire length but the top flange is undamaged and the cross-member is properly secured, it may be possible to repair the cross-member by installing a full length overlapping angle.

5.7.1.3 *Replacement*

When a cross-member cannot be repaired by straightening, inserting or patching, that should be replaced with a new one of same profile and design.

5.7.1.4 *Forklift pocket assembly*

This could be repaired by straightening, inserting, patching or replacing in same manner as done in case of cross-members.

5.7.1.5 *Goose neck tunnel*

This could be repaired by straightening, patching or replacing in same way as done in case of forklift pockets.

NOTE — While doing repairs to understructure cross-members, Fork-lift pockets and Gooseneck, etc, care should be taken to see that flooring bottom side rails and sills are not damaged or effected in anyway.

5.8 Flooring

Damages to the flooring are usually repaired by replacement (partial or full) of the floor planks or board. While repairing the flooring, the following limitations apply:

a) Replacement boards and undamaged remaining boards should cover at least four cross-members or fork pocket sides. However, if the originally installed by the manufacturer covers only three cross-members or fork pocket sides, they may be replaced by boards covering three cross-members or fork pocket sides.

b) Adjacent floor boards should not terminate on the same cross-member or fork pocket side.

c) Replacement board plank should be the same design and specification as the original one.

NOTE — After repairs, the floor should appear like original with top surface leveled properly.

5.9 Door Assembly

5.9.1 *Door Panels*

Repairs to door panels should be done by straightening or patching.

5.9.1.1 *Straightening*

Dented portion should be straightened by smithy process as far as possible without heating. Splits, cuts, tears or pin holes should be welded and ground smoothly.

5.9.1.2 *Patching*

If the damage cannot be repaired by straightening an insert may be installed. Insert should be of minimum 150 mm in length and at least 150 mm apart. Weld should not be made within 150 mm of the corners of the frame or the ends of the stiffeners.

5.9.2 *Door Hinges*

5.9.2.1 *Freeing hinges*

Hinge pins should be freed by using penetrating oil lubricate the hinge.

5.9.2.2 *Replacement of hinge pin*

After freeing the hinges, if it is noticed that there are plays between the bush and the pin, the pin should be replaced with over size pin.

5.9.2.3 *Replacement of hinge blade*

If the hinge blades holes are enlarged or become oval, it will be necessary to replace the hinge blade with new one. In this case, hinge pin and hinge lugs welded on the 'J-bar' may also have to be replaced as when the hinge blades are worn-out as the lugs holes also must have enlarged or become oval.

NOTE — While repairing or replacing the hinge mechanism care should be taken to see that the alignment of doors are proper.

5.9.3 *Locking Devices*

5.9.3.1 Locking bars, if jammed up, should be freed by applying penetrating lubricating oil and/or repairing the defects in the bar such as existence of bends, dents, crack, etc, by straightening and inserting a section.

5.9.3.2 *Locking brackets and keepers*

If broken, should be replaced. No attempt should be made to reconstruct the brackets or keepers by welding or metalizing.

5.9.3.3 *Locking handles and retainers*

Repairs to those parts should be done by straightening and/or replacement.

5.9.4 *Gaskets*

Repairs to gaskets require the use of an adhesive, cyanoacrylate adhesive should be used for bonding door gasket material, however, use of such adhesive is to be done very carefully as, cyanoacrylate adhesives will bond skin or clothing upon contact to an extent necessitating plastic surgery. Repair to gasket could be done by patching or sectioning, if the gasket on the whole is in good condition to give effective service for at least three years. However, in most cases the gaskets should be replaced.

5.10 Ventilators

5.10.1 *Steel Ventilators*

Steel ventilators usually get dented or torn. Such damage could be easily repaired by straightening or replacing. Repairs done on this part should bring the ventilator in original condition free from leakage, etc.

5.10.2 *Plastic Ventilators*

No repair is advisable on broken plastic ventilators.

It should be replaced with new one in the same manner as the original was fitted.

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